Renhets TEKNIK

THE NORDIC JOURNAL OF CONTAMINATION CONTROL AND CLEANROOM TECHNOLOGY NR 3:2023

Cleanroom Technology

- REPORTS AND INFORMATIONS - COMPANIES AND PRODUCTS

Renhets TEKNIK

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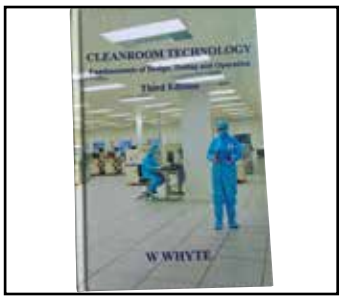

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KALENDER

2023

Nov

11 PHSS QP Conference 2023
The Glen Yr Afon House Hotel UK

2024

Maj

? R³ Nordic Årsmöte

October

? CTCB-I-certifiering Associate Level; Göteborg

? CTCB-I-certifiering Professional Level; Göteborg

? R³ Nordic Symposium in Norway

14-17 ISCC 24, Milano

Nästa nummer
beräknas utkomma den 14 december

Manusstopp / Annonsbokning:
14 november

Företag och medlem som vill delta med artikel eller release, skall sända detta i god tid före manusstopp till redaktör Alan Friis.

LEDARE

Dear R³ Nordic member

Autumn is slowly creeping in although the temperatures are still reasonable through the month of September. The work in the board and secretariat has been engaged in closing the accounts from the R³ Symposium and exhibition at Marienlyst Strandhotel in Elsingore, Denmark which will yield a surplus for the society and on working with the standards working group on their work on the guideline on Hospital Ventilation.

The board would like to recognize the working group and the contributors who are from Denmark: Flemming Malcho, Jan Mottlau; Finland: Kim Hagström, Jukka Vasara; Norway; Kari Solem Aune and Sweden: Lars Jansson, Bengt Ljungqvist, Berit Reinmüller. The guideline provides guidance and solid basis for design as well as for verification of the technical performance of ventilation systems. It also gives guidance for the users to assess the realization of the critical indoor parameters as well as life-cycle quality assurance of the systems performance. This guideline outlines basic requirements for proper design of ventilation systems for hospital applications. Please find the guideline here:

https://r3nordic.org/guidelines/

Next year the R³ Symposium and exhibition will be in Norway in the last half of October, and we will have an on-line Annual meeting in May. More information will follow soon.

The main story in this is issue is the new edition of the book on Cleanroom Technology by William Whyte

We still invite papers to be submitted to RenhetsTeknik and hope you all your findings and insights to us for publishing in the future.

We thank those who took time to answer the questionnaire concerning the future of RenhetsTeknik. The board will now discuss the results and come give you feedback in RenhetsTeknik 4:2024.

Best wishes

LENE BLICHER OLESEN,
ORDFÖRANDE

ALAN FRIIS
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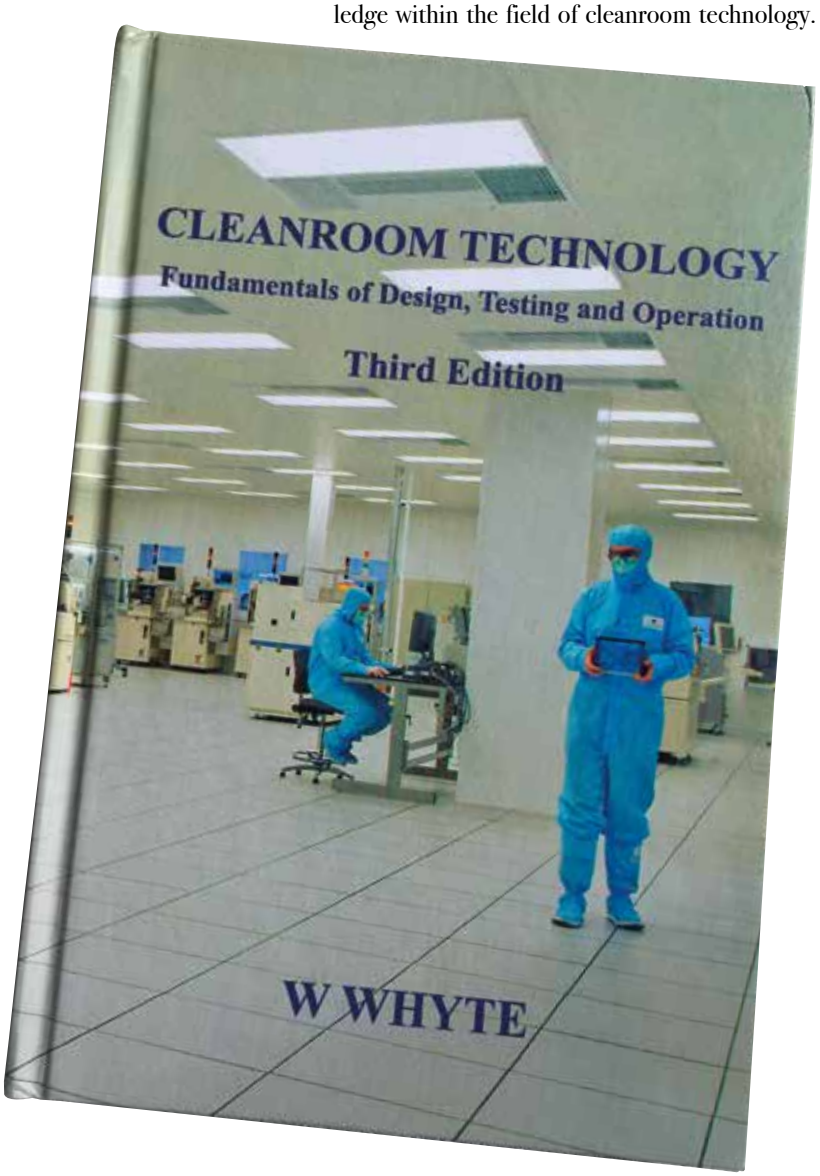
A new book on cleanroom technology

BY LARS EKBERG
CHALMERS UNIVERSITY OF TECHNOLOGY, GOTHENBURG, SWEDEN

The third edition of the book Cleanroom Technology by William Whyte was published in 2023. It is a comprehensive guide to the principles of cleanroom design, the methods for testing cleanrooms and the various aspects of cleanroom operation. A primary target group are people who recently have begun working, in one way or another, within the cleanroom industry. The book is also intended for experienced cleanroom professionals who wish to update their knowledge within the field of cleanroom technology. The book is also suitable as basis for teaching cleanroom technology.



The book has been updated with new information that has become available and the chapter division has been slightly changed. For example, there is a now a separate chapter about recovery performance and ventilation effectiveness; aspects which previously were included in the chapter about air movement, containment, and smoke visualization. Separate chapters about cleanliness classification and particle deposition rate have also been added. Aspects of materials, equipment and machinery in cleanrooms are now divided into one chapter regarding the use of equipment in cleanrooms, and another about the transfer of equipment into a cleanroom.

The author points out that some of the chapters in the current book are similar to the author's book Cleanroom Testing and Monitoring. This is inevitable since testing and monitoring is a subset of the much wider subject of cleanroom technology covered by the current book.

The author of the book, Dr. W. Whyte, is an awarded international authority on cleanrooms. He has been working with cleanroom design, testing, and operation for over five decades. He is engaged in various working groups that are developing, or have developed, cleanroom standards. He has extensive experience as an industrial consultant and educator within cleanroom technology.

Below, you can find an excerpt comprising the first chapter of the book, as a sample.

Cleanroom Technology

INTRODUCTION · THIRD EDITION

BY WILLIAM WHYTE

It is clear that a cleanroom is a room that is clean. However, a cleanroom has a special meaning that is defined in the International Organization for Standardization (ISO) standard 14644-1:2015 [ref 1] as: 'Room within which the number concentration of airborne particles is controlled and classified, and which is designed, constructed and operated in a manner to control the introduction, generation, and retention of particles inside the room.'

To achieve the requirements of this definition, a cleanroom is supplied with an exceptionally large quantity of air that has been filtered with high efficiency filters. This air is used to dilute and remove particles, microbes, and chemicals that are dispersed from personnel, machinery and other sources within the room, and used to pressurise the cleanroom to ensure that no contaminated air flows into it.

People and machinery can disperse millions of particles, and conventional building materials can easily break up and disperse particles. A cleanroom is therefore built with materials that do not generate particles and can be easily cleaned. Cleanroom personnel wear clothing that envelops them and minimises their dispersion of particles and micro-organisms. These and similar measures that minimise the amount of contamination in a cleanroom are discussed in this book. Cleanrooms can also control the temperature, humidity, sound, and lighting, within the room, but these properties are not exclusive to cleanrooms, and not discussed in any detail in this book.

Figure 1.1
A cleanroom with personnel wearing cleanroom clothing

1.1 THE NEED FOR CLEANROOMS

The origins of cleanrooms go back to more than 150 years ago, and are rooted in the control of infections of patients in hospitals. However, the need for a very clean environment for industrial manufacturing occurred in the 1950s, and led to the development of the modern cleanroom.

A cleanroom does not allow contamination to enter from outside the room, and controls the dispersion of contamination within a cleanroom, so that manufacturing can be carried out in a clean environment. A modern cleanroom can be up to ten million times cleaner than an ordinary unventilated manufacturing environment.

The uses of cleanrooms are diverse, and shown in Table 1.1 are examples of products being made in cleanrooms. This range of products will certainly be added to in the future, and continue the expanding demand for cleanrooms.

It may be seen in Table 1.1 that cleanroom applications can be broadly divided into two. Given in the top section of Table 1.1 are those industries where dust particles are a problem and their presence, even in sub-micrometre size, may prevent a manufactured product functioning, or reduce its useful life.

A major beneficiary of cleanrooms is the semiconductor fabrication industry. Semiconductors are used in microprocessors that are the 'brains' of a wide variety of products, such as computers, smartphones, aeroplanes, cars, TVs, and video games. Such particles can cause an electrical short circuit and ruin the semiconductor. To minimise contamination problems, semiconductors are manufactured in cleanrooms with very high standards of cleanliness.

Shown in Figure 1.2 is a contamination problem in a nanotechnology application. The photograph shows a contaminating particle that has a size of approximately 10 micrometres (one micrometre is one millionth of a metre). It is sitting in the centre of a field of carbon nanotubes, which are growing upwards and are only 2 to 3 nanometres in diameter (one nanometre is one hundredth of a micrometre). The growth of nanotubes around the particle is inhibited by chemical contamination diffusing from the particle with an area of inhibition of about 70 micrometres in diameter. Nanotubes beyond the edge of the area of inhibition are seen to grown normally.

The bottom section of Table 1.1 shows products that require the absence of microbes, as their presence could lead to human infections. The healthcare industry is a major user of cleanrooms, as contamination of their products by microbes could lead to illness, if their products are injected or infused into patients.

Bio-cleanrooms are supplied with air that is filtered free of microbes and is pressurised against the entry of airborne contamination from outside the room. Therefore, the sole source of

INDUSTRY	PRODUCT
Electronics	Computers, flat screens, printed circuit boards
Semiconductor	Integrated circuits in microprocessors used in a wide variety of products such as computer memory, automobiles and aircraft
Micromechanics	Miniature bearings
Optics	Lenses, laser equipment
Nanotechnology	A wide variety of products of nanometre size

Biotechnology	Antibiotics, genetically modified organisms
Pharmaceutical	Sterile pharmaceuticals
Medical Devices	Heart valves, cardiac by-pass systems, stents, catheters
Food and Drink	Brewery products, unsterilised food and drink

Table 1.1 Some cleanroom applications

microbes in cleanrooms is personnel. Microbes are dispersed into the air on skin particles, or to a lesser extent, on clothing fabrics or saliva from the mouth. Therefore, microbes are carried on particles of skin, fabric, or saliva, and called in this book, 'microbe-carrying particles (MCPs)'. The term 'viable particles' is a term also used in cleanroom technology to describe particles that have a microbe associated with them. However, 'microbe-carrying particles' is considered by the author to be a more descriptive term, and is used in this book. When a term is required in this book for the general description of a living thing that can only be seen with a microscope, 'microbe' is used, but the alternative term of 'micro-organism' is also used.

Hospital operating theatres use cleanroom technology to minimise wound infections, and shown in Figure 1.3 is an ultraclean operating theatre. This has a downward flow of unidirectional air from high efficiency filters in the ceiling of the canopy above the operation. Special surgical clothing is also used to minimise the dispersion of microbes, and this combination results in a very low concentration of airborne microbial contamination during surgery.

1.2 TYPES OF CLEANROOMS

Cleanrooms are available as two major types that are differentiated by their method of ventilation. These are unidirectional and non-unidirectional airflow, which are abbreviated to UDAF and non-UDAF, respectively.

Non-UDAF cleanrooms are variously known as 'turbulently ventilated', 'conventionally ventilated', 'mixed airflow', but the term 'non-unidirectional airflow' is the term used in the ISO cleanroom standards, and in this book. Shown in Figure 1.4 is the basic design of a non-UDAF cleanroom. This type of cleanroom receives its air supply from high efficiency air filters installed in air inlets in the ceiling. In many non-UDAF cleanrooms, air diffusers are used, as they will provide good mixing of supply air with room air, and ensure there are no locations where there is a poor supply of clean air and high concentration of airborne contamination. In other designs of cleanrooms, no diffuser is used but only a simple protective screen, which will produce a good

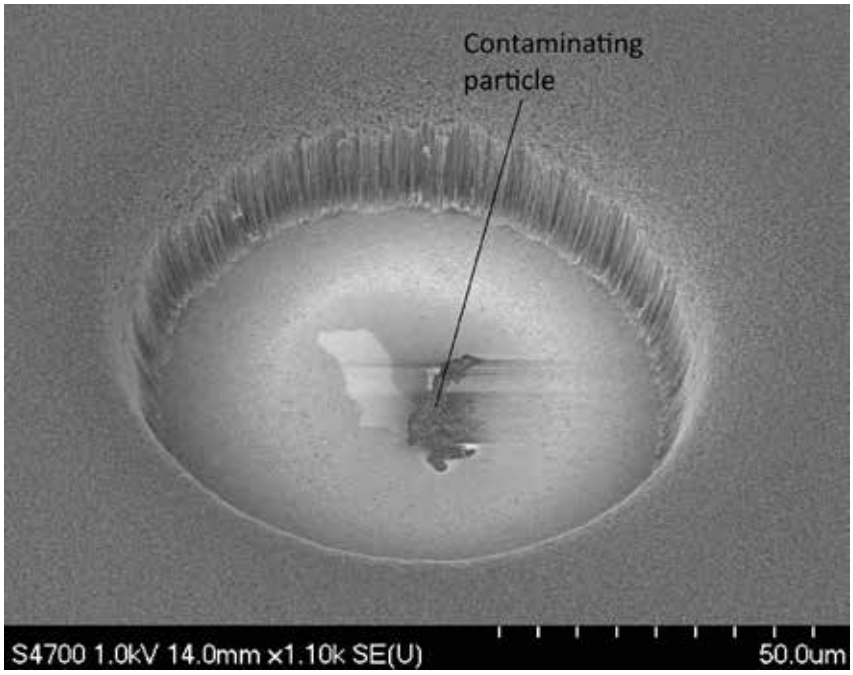


Figure 1.2 Contaminating particle inhibiting carbon nanotube growth

Figure 1.3
Undirectional airflow system ised om an operating theatre

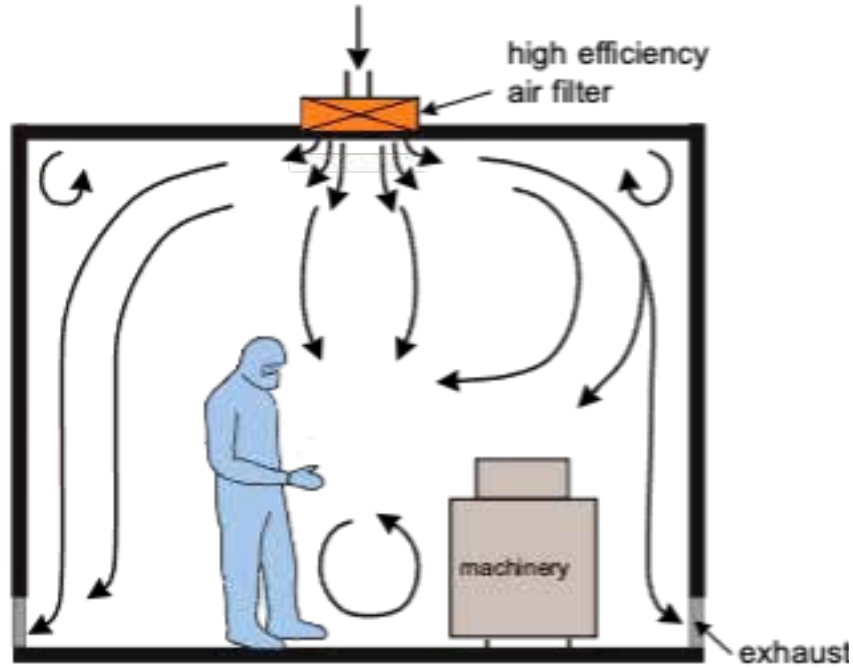


Figure 1.4 Non-UDAF airflow type of cleanroom

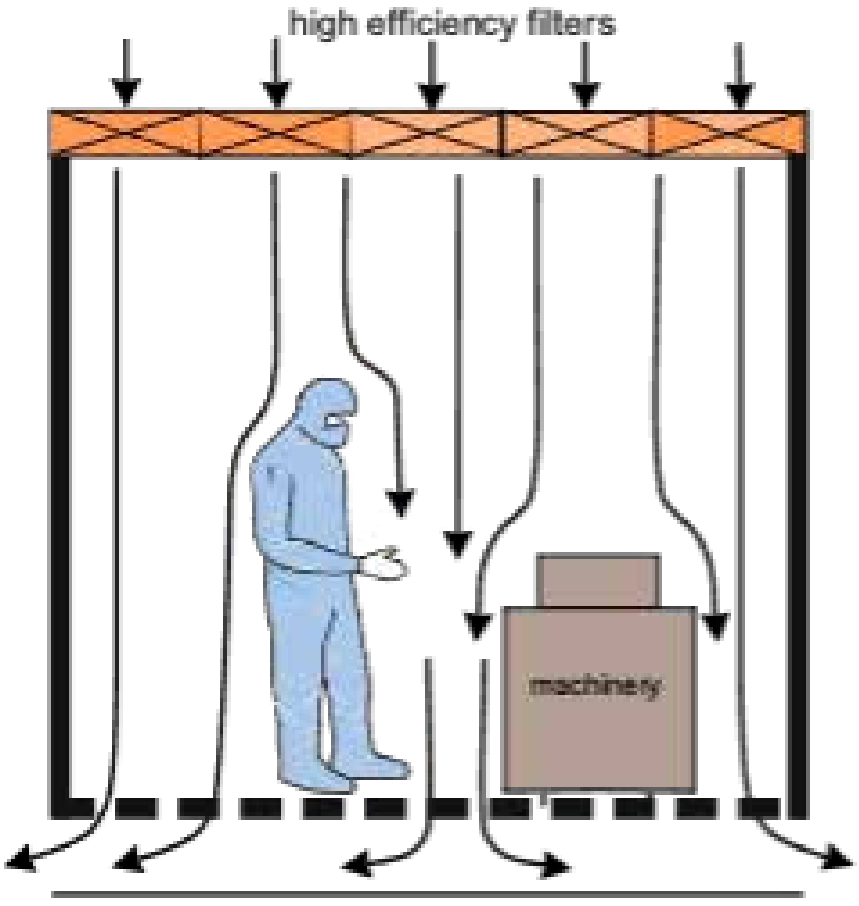


Figure 1.5 Unidirectional airflow type of cleanroom

supply of filtered air under the air inlet, but a poorer supply of clean air at other locations in the cleanroom and higher concentrations of airborne contamination.

In the non-UDAF design of cleanroom, the airborne contamination generated by people and machinery is mixed and diluted by the filtered air supply. It is then removed through air extracts that are normally positioned at the bottom of the walls and round the cleanroom. The air change rates are normally equal to, or more than, about 20 per hour, this rate being much greater than ordinary rooms, such as offices, where it might be in the region of 5 per hour.

Shown in Figure 1.5 is a typical design of a UDAF cleanroom. High efficiency filters are installed across the whole ceiling of the cleanroom. The filtered air sweeps down through the cleanroom in parallel lines in a piston-like way to the working area, where the unidirectional flow of air removes airborne contamination out through the perforated floor. An alternative and less common configuration of UDAF cleanroom is a horizontal flow UDAF cleanroom, which has high efficiency filters across the whole of one wall, and the air supply flows horizontally across the room and exits through the opposite wall. The velocity of the unidirectional airflow is generally between 0.3m/s (60ft/min) and 0.5m/s (100ft/min). UDAF cleanrooms use much more air than non-UDAF cleanrooms but give superior cleanliness conditions.

UDAF cleanrooms were originally known as ‘laminar flow’ cleanrooms, but this was a mistake, as ‘laminar flow’ has a meaning in physics and engineering that does not describe the type of airflow found in this type of cleanroom. ‘Unidirectional’ is the correct way of describing this airflow, and is the term used in the ISO cleanroom standards, and this book.

Separative clean air devices provide a localised supply of high-quality clean air. There are various designs of these devices, such as UDAF workstations, RABS, mini-environments, and isolators. These are installed in both non-UDAF and UDAF cleanrooms to give enhanced clean conditions where it is required, e.g. in a critical location where product or a process is exposed to contamination.

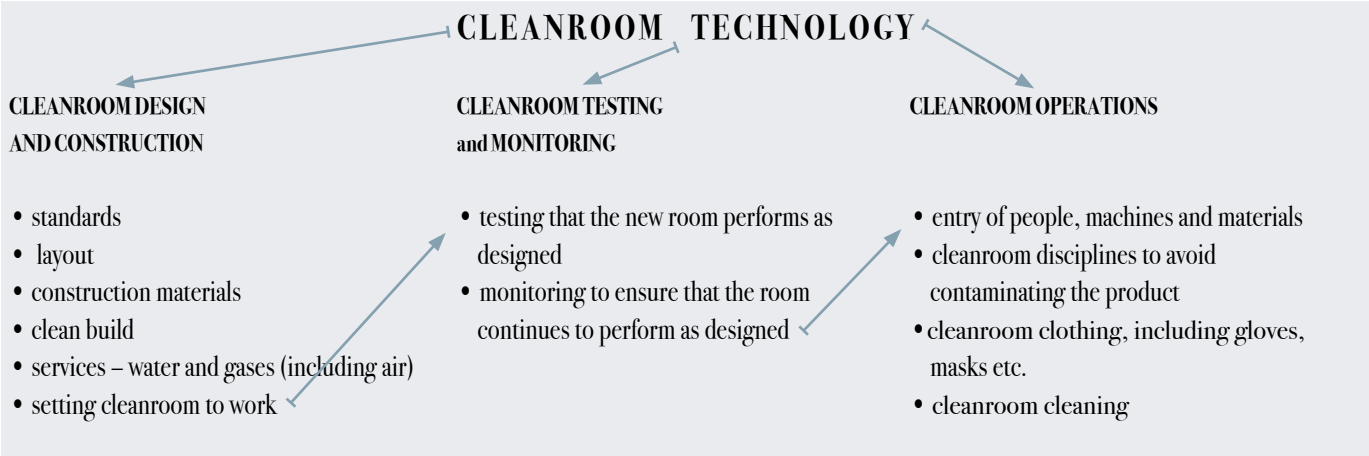


Figure 1.6
Main subject areas of cleanroom technology

It should be noted that, for simplicity, this book often refers to 'cleanrooms', where both 'cleanrooms' and 'separative clean air devices' are being discussed.

1.3 WHAT IS CLEANROOM TECHNOLOGY?

The three subject areas of cleanroom technology are shown in Figure 1.6, namely, (a) design and construction, (b) testing and monitoring, and (c) operation. These can be considered to parallel the application of cleanroom technology to manufacturing, as a cleanroom user moves from deciding what type of cleanroom they require, to finally manufacturing in the cleanroom.

It is firstly necessary to design and construct the room. To do this one must consider (1) design standards, (2) design layout (3) construction, including construction materials, and (4) building services such as the filtered air supply. Secondly, after the cleanroom has been constructed, it must be commissioned and tested to ensure that it is functioning as designed, and producing the required standard of cleanliness. Also, during its lifetime, the cleanroom must be monitored to show that it continually achieves the cleanliness standards that are required.

Finally, the cleanroom must be correctly operated, so that manufactured products are not contaminated. This requires that entry of people and materials, garment selection, cleanroom disciplines, and cleaning of the room, are all correctly carried out.

These three subject areas of Cleanroom Technology are covered in this book in the same order as shown in the drawing but in a holistic way. Therefore, this book firstly discusses design and construction of cleanrooms, before moving on to testing cleanrooms, and then to operating a cleanroom.

BIBLIOGRAPHY

1. ISO 14644-1: 2015. Cleanrooms and associated controlled environments – Part 1: Classification of air cleanliness by particle concentration. International Organization for Standardization, Geneva, Switzerland.

ACKNOWLEDGEMENTS

Figure 1.1 of a cleanroom is reproduced by permission of the Guardtech Group. Figure 1.2 of carbon nanotubes was supplied by Murray Whyte. Figure 1.3 of an ultraclean operating theatre is reproduced by permission of Fishers Services.

Lennanderföreläsning 2023

Lennanderföreläsningen arrangeras varje år inom kirurgi eller hygien av Svenska Läkaresällskapet i syfte att sprida kunskap

Ca en tredjedel av alla vårdskador i Sverige är vårdrelaterade infektioner. I praktiken innebär det att 3-4 patienter dör varje dag pga en sådan infektion men ändå är läkare dåliga på att följa hygienrutiner, varför?

Birgitta Lytsy är årets Lennanderföreläsare och höll den 6 september en inspirerande föreläsning på SLS-huset om just detta och hur läkare behöver ta kommandot över patientsäkerheten. Du kan se den inspelade föreläsningen på YouTube.

Birgitta är specialist i klinisk bakteriologi och vårdhygien, docent vid Uppsala universitet samt sekreterare i the International Federation of Infection Control (IFIC). Sedan januari är hon överläkare på Vårdhygien i Region Stockholm där hon bla annat kommer att jobba med våra AT- och ST-utbildningar för att framtidens läkare ska vara bättre på hygien och helt enkelt bli bättre på patientsäkerhet.

Tyvärr sker kunskapsöverföring inom vårdhygien långsamt, läkare behöver ta större ansvar för vårdrelaterade infektioner. Vårdrelaterade infektioner är den största andelen av vårdskador.

EJPPS Volume 28 Issue 2

EJPPS
EUROPEAN JOURNAL OF PARENTERAL AND PHARMACEUTICAL SCIENCES

Peer Review Papers

- Glove disinfection and aseptic technique: Creating a schema for the cleanroom and laboratory by Tim Sandle
- Evaluation of the in-vitro antifungal activity of Holoptelea Integrifolia ethanolic extract by Priyanka Chaturvedi*, Praveen Sharma

Opinion Papers

- Pharmacopeial sterility test: The statistical limitations of sampling by Tim Sandle
- The Fallacy of Sterile Gowns - Response to Editorial by Russell Madsen by Tim Eaton

Editorial

- Guest Editorial: Implementation of Revised Annex 1 by Simon McEwen
- PHSS News by Jenni Tranter

Regulatory Update

by Malcolm Holmes

New guideline on Hospital Ventilation

R³ Nordic is happy to announce publication of a new guideline on Hospital Ventilation.

The guideline is written by the group of Nordic experts from Denmark, Finland, Norway, and Sweden having decades of international experience within the field. For several years there has been a common understanding by authors of this document about the solid basis for Hospital Ventilation design that have now been published in this common guideline for the Nordic countries.

This design guide provides guidance and solid basis for design as well as for verification of the technical performance of ventilation systems. It also gives guidance for the users to assess the realization of the critical indoor parameters as well as life-cycle quality assurance of the systems performance.

This guideline outlines basic requirements for proper design of ventilation systems for hospital applications. The guideline expresses what is perceived to be best practice in the field at the point of publication. he published guideline is under continuous maintenance by R³ guidelines section to make them living documents being able to include new advancements and feedback from the field.

We would like to recognize contributors from Denmark; @Flemming Malcho, @Jan Mottlau, Finland; @Kim Hagström, @Jukka Vasara, Norway; @Kari Solem Aune and Sweden; @Bengt Ljungqvist, @Lars Jansson, @Berit Reinmüller.

The full document may be downloaded for free from the following link: https://r3nordic.org/guidelines/

From the Asian Symposium on Contaminant Control (ASCC) 2023 – It's visible in the picture.

Asian Symposium on Contamination Control

The second Asian Symposium on Contamination Control (ASCC) was held from September 20 through 22, 2023 in Kanazawa, Japan. After the conference the ICCCs COD meeting takes place. Nordic participants and presenters were Kari Solem Aune and Kim Hagström.

Aktuellt inom Standardisering

INTERNATIONELLT

ISO/TC 304 WG 3 Hand Hygiene is happy to announce that the ISO/FDIS 23447 Hand Hygiene Standard was unanimously approved by the TC. Congratulations to everyone who labored for many years to bring this project to its conclusion.

ISO TS 198 WG 9 Aseptic Processing Recommendations of the 39th meeting on 21st September 2023, 1) Start of a minor Revision of ISO 13408-2:2018 ISO/TC 198/WG 9 based on comments received on the 2023 Systematic Review. 2) Confirmation of ISO 13408-7:2012, ISO/TC 198/WG 9 recommends confirming ISO 13408-7:2012 after evaluating of comments received on the 2023 Systematic Review.

I**SO/TC209** working group 2 Biocontamination control continuous the ongoing ISO-fication of the European Standard EN 17141 Cleanrooms and associated controlled environments Biocontamination control. Convenor is Conor Murray, Head of Delegation for Ireland and NSAI at ISO/TC 209. The work is divided into several subgroups. To unify different opinions and go forward to an acceptable content takes time and efforts. The next meeting is planned as a 2-day hybrid meeting on the 16th and 17th October in Chicago, courtesy of IEST.

NATIONELLT

SIS bjuder in till firande av World Standards Day!

Kom och fira World Standards Day och delta i ett program inramat av musik, inspirerande talare, prisutdelning och mingel, fredagen den 13 oktober 2023

Det blir ett härligt avslut på veckan och en gemenskap kring innovativa insatser som stärker svensk konkurrenskraft och ger samhällsnytta.

När juryn är klara med första urvalet kommer tre finalister tävla om vem som får det första Standardiseringspriset. Stort tack till juryledamöterna Jan Larsson, Business Sweden. Mattias Lindahl, Linköpings Universitet. Susanne Nellemann Ek, BIM Alliance och Pia Sandvik, Teknikföretagen. Under samma event hyllar vi även den ordförande, convenor och kommitté som utmärkt sig mest det gångna året.

Vi är glada att ha Daniela Kragic Jensfelt som keynote-speaker. Hon kommer att engagera kring ämnet (AI) Artificiell intelligens: utmaningar och möjligheter.

SIS TK 108 Renhetsteknik håller sitt höstmöte i Trosa i samband med företagsbesök på Camfil.

SIS TK 333 Operationsrumstextilier höll sitt höstmöte i Göteborg i samband med ett företagsbesök på RISE den 19 september, där bl a nästa års aktiviteter planerades. EN 13795 del 1 och del 2 ”Operationsrumskläder och draperings material”, granskades efter utförd revision. Reviderade dokument kan granskas under hösten.

SIS TS39 Mikrobiologisk luftrenhet vid kirurgiska ingrepp – Förebyggande av luftburen smitta – Vägledning och grundläggande krav har uppdaterats efter vårens remissrunda och nu väntar ett arbetsgruppsmöte i november med en förhoppningsvis sista genomgång av text. Texten har uppdaterats, omdisponerats och granskats. Ett nytt krav är angivna målvärden (CFU/m^3), som ska användas för tekniska beräkningar när ventilationssystem designas.

UofL scientists invent antimicrobial surfaces inspired by cicada wings

By BETTY COFFMAN - AUGUST 29, 2023 - PHOTO: Ing Image

UofL researchers developed a fabrication technique to efficiently and accurately imitate the nanostructure of cicada wings for potential use as an antimicrobial in everyday surfaces

Discoveries in nature often inspire scientists to create things that benefit people. For example, the wings of the North American annual cicada – whose distinctive sound heralds the end of summer – are inhospitable to bacteria, antireflective, hydrophobic and provide camouflage.

"We often look to mother nature for interesting things. When scientists take a look at these things, it often involves the nanoworld," said Kevin Walsh, associate dean of research and facilities, professor of electrical engineering at UofL's J.B. Speed School of Engineering and founding director of UofL's Micro/Nano Technology Center (MNTC).

Cicada wings' antibacterial properties in particular interested University of Louisville engineers. Along with UofL biologists, the team analyzed the nanostructure of the insects' wings and developed a nanofabrication technique to replicate it for potential use in spaces where bacteria are undesirable, such as food service, health care facilities and medical devices.

The team, led by Chuang Qu, Walsh and Mark Running, has developed a process to synthesize a surface material that mimics the wings' structure and has the same anti-bacterial and water repellant properties as the wings that inspired it. The development and testing of the innovative manufacturing process was made possible through the use of state-of-the-art facilities at MNTC, which include a scanning electron microscope (SEM) and nanomaterial production capabilities.

With the help of an SEM, scientists can see that cicada wings' surface consists of tiny, bowling-pin-shaped structures with a diameter of around 100 nanometers – about one-thousandth of the diameter of a human hair. The wings owe their antibacterial properties to the spike-shaped tops which act like daggers, piercing the cellular membranes of bacteria that have the misfortune of landing on them, ultimately killing the bacteria.

To replicate the cicada wings' nanopillar cone structure, Qu, a senior research engineer at Speed School specializing in advanced nanofabrication, developed a two-step process of self-assembly and glancing-angle deposition (GLAD).

"All the structures we discovered under the microscope are challenging to recreate because they are so small and three-dimensional," Qu said. "Using a two-step self-assembly plus glancing angle deposition, we were able to recreate the structure and confirm that, like their cicada wing template, they have these antimicrobial properties."

Lindstrom opens its first cleanroom laundry for electronics industry in Tianjin

https://www.cleanroomtechnology.com/news/article_page/Sep-2023

The Finland-based textile manufacturer has continued its investment in China by opening a cleanroom laundry for the electronics industry in its Tianjin service centre

Lindström has continued its investment in China by opening a cleanroom laundry for the electronics industry in its Tianjin service centre. Tianjin is the seventh largest city in China, located in the Northeast of the country.

The company provides the electronics industry with a turn-key solution with anti-static workwear, as well as its washing and maintenance in the new cleanroom laundry.

There are more than 2,000 electronics manufacturing companies in Tianjin that can benefit from the service, and most of them are located in the Binhai area where the Lindström service centre is based.

Tianjin e-cleanroom is Lindström's fourth high-level cleanroom in China, including pharmaceutical and electronic cleanrooms. We will continue to plough into the Chinese market to bring professional workwear services to more companies in the future.

Österrikiska Revo Foods lanserar en 3D-printad vegansk laxfilé av svenskt mykoprotein tillsammans med detaljhandelskedjan REWE.

Foto: Pressbild / Text:Carina Malm

I september lanserade det österrikiska livsmedelsteknikföretaget Revo Foods THE FILET – Inspirerad av lax hos REWE/BILLA. Det uppges bli första gången som 3D-printad mat säljs i butik. I Sverige kommer produkten även att finnas tillgänglig att beställa från Revo Foods hemsida från och med den 1 oktober.
Huvudingrediensen i THE FILET är Promyc, en mykoprotein-ingrediens baserad på filamentösa svampar med en naturlig köttliknande struktur.
Mykoproteinbasen har utvecklats av svenska Mycorenas forskningsteam för att passa speciellt för 3D-printade produkter, vilket även gör produkten till den första applikationen av sitt slag. Utvecklingen har skett med hjälp av stöd på 1,5 miljoner euro från det europeiska finansieringsprogrammet Eurostars 3 med medfinansiering från Europeiska unionens forsknings- och innovationsprogram Horizon Europe.
Promyc bidrar med majoriteten av proteinet till Revo-filén och inkluderar alla essentiella aminosyror, fibrer bestående av beta-glukaner samt B-vitaminer och mineraler som zink och kalcium. THE FILET har ett Nutriscore-betyg av A på grund av sitt höga protein- och omega-3-innehåll.
– Samarbetet mellan Revo och Mycorena möjliggjorde anpassningen av Promyc-produktionsprocessen för att uppnå de nödvändiga egenskaperna som passar Revos 3D-MassFormer-teknologi och andra 3D-printverktyg. Med detta är Mycorenas mykoproteinprodukter fullständigt anpassade till en framväxande tillverkningsteknik som vi tror kommer att spela en nyckelroll i framtidens mat, säger Paulo Teixeira, Chief Innovation Officer på Mycorena

Den ny tekniken möjliggör en fullständig integration av fett i en fibermatris, vilket leder till en ny generation av autentiska produkter, såsom veganska biffar och filéer. Genom att använda sin patentsökta 3D-MassFormer-teknologi har Revo Foods utvecklat den första kontinuerliga produktionsprocessen som kan massproducera 3D-printade livsmedel.
– Med milstolpen i sikte att uppnå industriell skala på 3D-printad mat går vi in i en ny matrevolution, en tid där mat kan tillverkas helt enligt kundens behov. Vi skapar inte bara ett veganskt alternativ; vi formar en ny framtid för matproduktion, säger Robin Simsa, CEO på Revo Foods

NorthX Biologics Welcomes Dr Janet Hoogstraate as New CEO Following Merger with Valneva Clinical Trials Manufacturing Unit

August 23, 2023 04:00 ET| Source: NorthX Biologics Matfors AB

Janet Hoogstraate commented, “I very much look forward to building on the success of NorthX and taking it to the next phase of development. We work in an area which is rapidly advancing and NorthX is now poised to become the leading Nordic provider of fully integrated bacterial and mammalian development and GMP manufacturing services from our hubs in Sweden. With the combination of these dedicated teams and capabilities I am confident that we will bring value to both global and local customers in their biologics development and processing needs and enable innovative biologics to revolutionize healthcare”.


Janet Hoogstraate

Northx tar över Valnevas anläggning – och hoppas på tillväxt

NorthX Biologics, a leading Nordic Development and Manufacturing Organization, has expertise in producing cell and gene therapies, proteins, vaccines, other advanced biologics. With two sites in Sweden and headquartered in Matfors, the team has been manufacturing biologics to GMP standards since 1992. In 2021 NorthX was designated a national innovation hub for advanced therapies and vaccines and has the ambition to become a leading cell and gene therapy manufacturer and partner for innovative drug development companies. For more information see www.nxbio.com.

Valtria i överenskommelse med Ventilator Renrum

Valtria Sweden AB har slutit ett samarbetsavtal med Industriaktiebolaget Ventilator AB om att från den 1 september 2023 driva vidare Ventilators nuvarande entreprenadverksamhet inom affärsområdet ”Renrum”. Valtria kommer tillsammans med tidigare medarbetare på Ventilator fortsätta affärerna med befintliga och nya kunder.

Ventilator kommer fortfarande utföra service och montage i befintliga anläggningar men primärt fokusera på bolagets övriga ventilationsverksamhet och dess entreprenader.

Valtria Sweden AB ingår i Valtria Group som är en global koncern med kärnverksamhet inom design och nyckelfärdig byggnation av renrum för kritiska och kontrollerade produktionsmiljöer för olika typer av tillverkningsprocesser. Bolaget finns i fler än 10 länder och omsätter 1,3 miljarder SEK.

Valtria har verkat i Skandinavien under många år och har i år etablerat eget dotterbolag i Sverige, Valtria Sweden AB, med säte i Kista utanför Stockholm.

Bolaget är inom koncernen geografiskt ansvarig för projekt i Sverige och Norge.

Fr o m oktober 2023 kommer Karoly Gér att förstärka Valtria Sweden AB.

Vidare information om Valtria återfinns på www.valtria.com
För frågor vänligen kontakta
Valtria Sweden AB Industriaktiebolaget Ventilator AB
Johan Bergdahl Rickard Melkersson
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AstraZeneca fortsætter væksten og flytter til Carlsberg Byen

Astra Zeneca - 13 JUNI 2023 09:22

AstraZeneca er i vækst og flytter den 1. september ind i en moderne bygning i et attraktivt område, som øger nærheden til både samarbejdspartnere og de talenter, man gerne vil tiltrække. Flytningen er i tråd med tilsvarende strategiske flytninger og bære dygtighedsambitioner hos AstraZenecas afdelinger i de øvrige nordiske hovedstæder.

Martin Nilsson Jacobi ny rektor på Chalmers

Chalmers juni 2023

Styrelsen för Chalmers tekniska högskola har utsett Martin Nilsson Jacobi, idag vd för Chalmersstiftelsen, till ny rektor och vd för högskolan. Han efterträder Stefan Bengtsson som varit rektor i åtta år.

Martin Nilsson Jacobi är sedan 2020 vd för stiftelsen Chalmers tekniska högskola. Han är bosatt i Göteborg, professor i komplexa system och har en bakgrund inom teoretisk fysik. Han är 50 år och disputerade vid Chalmers år 2000. Martin Nilsson Jacobi har under sin karriär haft flera ledande positioner inom den akademiska världen. Exempelvis har han varit fakultetsrådsordförande och prefekt på Chalmers. Han har även internationell forskarerfarenhet.

– Jag känner mig ödmjuk inför uppgiften och tacksam för förtroendet att leda Chalmers vidare utveckling mot internationell toppklass, säger Martin Nilsson Jacobi.

R³ NORDIC, CTCB-I OCH CHALMERS INVITE TO

Cleanroom Testing & Certification

October 2024

Installationsteknik, Chalmers, Göteborg

The course material is intended for self-study prior to attending the lectures.
The content of the course material, written in English, forms the basis for the lectures.
The course material will be delivered after payment of a registration fee, at latest one month before the start of the course.
Candidates can apply for either of two levels of certification; Professional or Associate. As proof of the certification, a diploma will be issued to each participant who completes the course and passes the examination.

ASSOCIATE LEVEL

For people who are either familiar with some aspects of cleanroom testing, and wish to gain knowledge about the subject (purchasers and evaluators of clean room testing), or have been working less than two years as a cleanroom tester, but wish to use the certification course as a basis of training and working towards professional status. If you apply for the associate course, and have suitable qualifications, you will be required to:

- study the self-study course material that will be sent to you, attend a lecture course, and then pass a written examination on cleanroom testing
- attend a demonstration exercise on practical aspects of cleanroom testing.

PROFESSIONAL LEVEL

For people whose profession is cleanroom testing, and who routinely carries out all aspects of cleanroom testing. At the time of their exam they should have a minimum of two years' experience. If you apply for, and have suitable qualifications, you will be required to:

- study the self-study course material that will be sent to you, attend a lecture course, and then pass a written examination on cleanroom testing
- Complete a particle counting exercise.
- pass a practical exam by showing a high level of competence in (a) filter integrity testing and (b) measuring air velocities and volumes and write adequate reports

  Note that certificates on Professional Level are valid for five years. Recertification is required to maintain certification on Professional Level beyond five years.

COURSE FEES 2024

CTCB Associate Level - 2 days in Gothenburg
Included: Course material, lecture notes, written exam, practical demonstration and lunch both days.
Registration fee: SEK 4 500
Course and exam fee: SEK 13 800

CTCB Professional Level - 3 days in Gothenburg
Included: Course material, lecture notes, written and practical exams and lunch day 1 and 2.
Registration fee: SEK 4 500
Course and exam fee: SEK 17 200

Exam Re-sit and Upgrading from Associate to Professional Level - 1 day in Gothenburg
Candidates who do not pass a practical exam (filter leak testing and/or air velocity) can "re-sit" the exam within one year. Candidates who wish to upgrade their certificate from associate to professional level can complement with the practical exam within one year.
Registration fee: SEK 3 400
Practical exams fee: SEK 4 000 *(per exam)*

Recertification CTCB Professional Level - 3 days in Gothenburg
Included: Course material, lecture notes, practical demonstration, written and practical exams.
Registration fee: SEK 4 500
Course and exam fee: SEK 14 300

Note 1: Candidates who are not already members of R³ Nordic or another ICCCS affiliated society will also be charged the cost of one year's individual membership - currently SEK 650,- in R³ Nordic.

Note 2: VAT will be added to all prices given above.

Note 3: Any costs required for accommodation are the responsibility of the candidate.

Further information is available at www.safetyventilation.com
Questions and application form: Victoria Edenhofer
victoria.edenhofer@chalmersindustriteknik.se /+46 (0)70 440 64 68
Course examinator: Lars Ekberg
lars.ekberg@chalmersindustriteknik.se /+46 (0)70 315 11 55

Note: The number of seats is limited.

MARKNADSGUIDE

FÖRETAGS- & BRANSCHREGISTER ÖVER STÖDJANDE MEDLEMMAR I R³ NORDIC

DK DANMARK +45 FIN FINLAND +358 NO NORGE +47 SE SVERIGE +46

FÖRBRUKNINGSMATERIAL FÖRPACKNING PROCESS

AET ARBEIDSMILJØ OG ENERGITEKNIKK AS (NO)
Ing.firma, prosjektering, produkter for renrom.
Tel 23 06 73 30 / info@aet.no

INSTRUMENT ÖVERVAKNING VALIDERING KALIBRERING

CRC CLEAN ROOM CONTROL AB (SE)
Kvalificering & kontroll av renrum, LAF, säk.bänkar och skyddsvent. Mikrobiologiska tester. Rökstudier.
info@cr-control.se / www.cr-control.se

MY AIR AB (SE)
Kontroll och validering för att minimeraluftburen smitta och säkerställa processer
Tel 072-503 84 59 / lars.jansson@myair.se

NINOLAB, AB (SE)
Partikelräknare, automatisk övervakning. Bänkar. LAF-tak, luftduschar. Niklas Nordin.
Tel 08-59096200 / info@ninolab.se

PARTICLE MEASURING SYSTEMS (DK)
Partikelräknare, sensorer och system.
Lars Peter Kristensen, Tel: 25 21 82 88
lpkristensen@pmeasuring.com

PSIDAC (SE)
Gain control and safer healthcare environments - CPS 6000 Monitor System
Björn Österlund / www.psidac.com

MIKROBIOLOGI STERILISTERING

GETINGE FINLAND OY (FI)
Peter Holmberg
Tel 040 900 4620 / peter.holmberg@getinge.fi

MICLEV AB (SE)
Biologiska indikatorer, färdigberedd media, sterilisering, luftprovare, mikroorganismer.
Tel 040-365400 / info@miclev.se

NINOLAB, AB (SE)
Inkubatorer, värmeskåp, class100 sterilasatorer. Autoklaver - diskmaskiner. Niklas Nordin.
Tel 08-59096200 / info@ninolab.se

KONSULTER PROJEKTERING

CIT ENERGY MANAGEMENT AB (SE)
Teknisk utveckling, validering, funktionskontroll inom luftrenhet, klimat och energi. 0762-345818
mari-liis.maripuu@chalmersindustriteknik.se

CRC CLEAN ROOM CONTROL AB (SE)
Kvalificering & kontroll av renrum, LAF, säk.bänkar och skyddsvent. Mikrobiologiska tester. Rökstudier.
018-246460 / info@cr-control.se

VENTILATOR RENRUM, INDUSTRI AB (SE)
Renrum, säkerhets- och sterilbänkar. Lufttak. Projekt ventilation, entreprenader, utrustning.
Tel 070-9711454 / bjarne.osterberg@ventilator.se

RENRUM OP-RUM LAF INREDNING BÄNKAR TAK

AET ARBEIDSMILJØ OG ENERGITEKNIKK (NO)
Ing.firma, prosjektering, produkter for renrom.
Tel 23 06 73 30 / info@aet.no

CRC MEDICAL AB (SE)
Kundunika renluftslösningar för miljöer med mycket höga krav i sjukhus och sterilcentraler
070-389 63 22 / anders.rehn@crcmed.com

CAVERION SVERIGE AB (SE)
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070-6188052 / henrik.fredlund@caverion.se

MENARDI FILTERS EUROPE A/S (DK)
Renrum. OP-tak.
Tel (070) 521 2565
anders.lofgren@menardifilters.com

NINOLAB AB (SE)
Renrum, säkerhets- och sterilbänkar. LAF-tak (ScanLaf), Thermo Partikelräknare (MetONE)
Tel 08-59096200 / info@ninolab.se

VENTILATOR RENRUM, INDUSTRI AB (SE)
Renrum, säkerhets- och sterilbänkar. Lufttak. Proj ventilation, entreprenader, utrustning.
Tel 070-9711454 / bjarne.osterberg@ventilator.se

RENGÖRING STÄDNING

PHARMACLEAN AB (SE)
Konsultation, lokalvårdsutbildning och lokalvård för renrum. Regina Björnsson.
Tel 0708-986428 / www.pharmaclean.se

PIMA AB, SERVICEFÖRETAGE (SE)
Bemanning - Entreprenad - Konsultation
www.pima.se
Tel 08-55424610 \ kontakt@pima.se

RENRUMSKLÄDER TEXTILIER TVÄTTNING

BERENDSEN TEXTIL SERVICE AB (ELIS) (SE)
Renrumstvätteri. Renrumskläder.
Tel 020-740116 / goran.nilsson@elis.com

NINOLAB AB (SE)
Säkerhets- sterilbänkar. LAF-tak o luftduschar (ScanLaf), Thermo Partikelräknare (MetONE)
Tel 08-59096200 / info@ninolab.se

TEXTILIA GROUP A/S (DK)
Kongebakken 1, 2765 Smørum
Tel 70 10 16 68 / www.textilia.com

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Renrum, säkerhets- och sterilbänkar. Lufttak. Proj ventilation, entreprenader, utrustning.
Tel 070-9711454 / bjarne.osterberg@ventilator.se

VENTILATION FILTER

CAMFIL SVENSKA AB (SE)
Renluftslösningar. HEPA-, ULPA och gasfilter. Till- och frånluftsdon. www.camfil.se
Tel 040-6806733 / robert.lovgren@camfil.com


Bli medlem i R3 Nordic
Läs mer på www.r3nordic.org